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COMMENTS ON THE NEARCTIC MEMBERS OF THE GENUS PRECIS HUEBNER

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The genus *Precis* Huebner 1819 includes an assemblage of species of nearly world-wide distribution. The new world species have customarily been placed in the genus *Junonia* Huebner 1819. A genitalic examination of three old world species and of the nearctic species as represented by specimens from the United States, Mexico, and South America, indicates that both the old world and the new world species are extremely similar genitalically even in species that differ remarkably in appearance, and in my opinion should be united under one genus. The gentalia of *Precis orithya* (Linnaeus) (Indonesian specimens) and those of *Junonia coenia* Huebner from the United States, are so similar as to leave no doubt of their congeneric relationship. In fact, certain workers, the present author among them, have in the past held that *coenia* might be regarded as a subspecies of *orithya*.

Since custom has fixed the usage of *Precis* for the old world species, and *Junonia* for those of the new world, and since both of these genera were first proposed on succeeding pages of the same work (Huebner, Verz. bek. Schmett. 1819, (3)33, *Precis* and (3)34, *Junonia*), we may look at some of the past history of these two genera to see if any previous worker has expressed an opinion as to which genus should have preference in the event that these two genera should be united.

Selection of the type species for each of these genera was made by Scudder. From among the eight nominal species listed by Huebner under *Junonia,* Scudder in 1872 selected *Papilio*

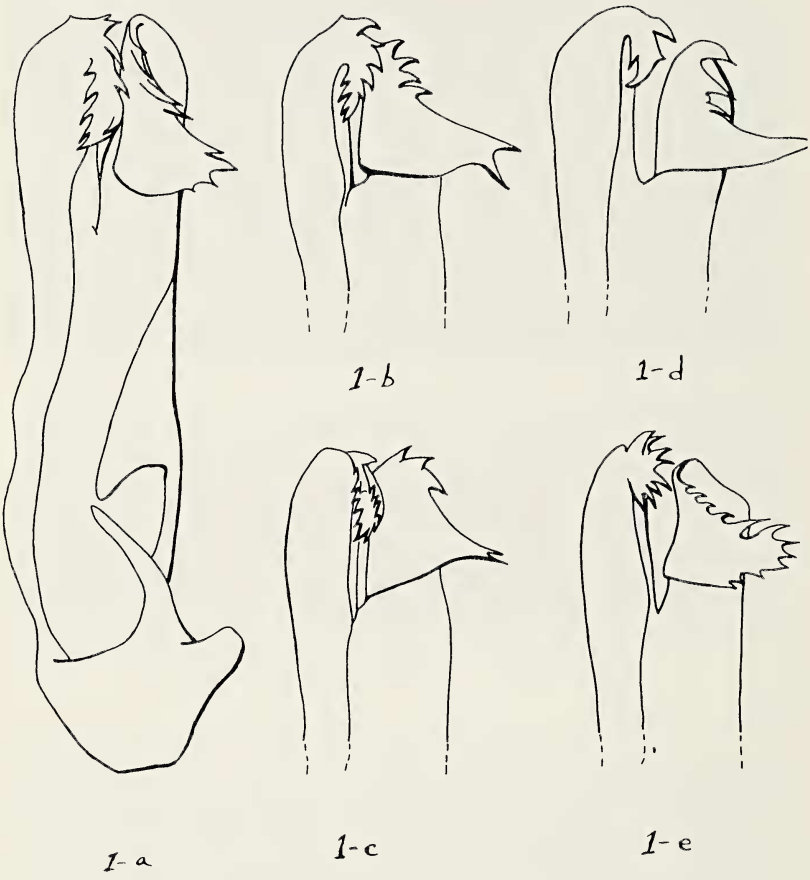

Fig. 1-a.—*Precis coenia* (Huebner), ♂, internal aspect of valve.
Fig. 1-b.—*Precis evarete* (Cramer), ♂, tip of valve.
Fig. 1-c.—*Precis nigrosuffusa* (Barnes & McDunnough), ♂, tip of valve.
Fig. 1-d.—*Precis evarete zonalis* (Felder & Felder), ♂, tip of valve, atypical (?).
Fig. 1-e.—*Precis orithya* (Linnaeus), ♂, tip of valve.

lavinia Cramer 1775 as the type. *Papilio lavinia* Cramer 1775 is considered a junior homonym of *Papilio lavinia* Fabricius 1775. *Papilio lavinia* Fabricius is a moth. Zimsen (1964) considers it a member of the present genus *Urania*. *Papilio lavinia* Cramer is thus unavailable for use as a name in the genus *Precis* (*Junonia* auct.). The oldest available name for *Papilio lavinia* Cramer appears, on subjective taxonomic grounds, to be *Papilio evarete* Cramer 1780.

In 1875 Scudder selected *Papilio octavia* Cramer 1777, an old world species and one of the two species included by Huebner, as the type of *Precis* Huebner. *Precis* has page precedence over *Junonia*. Page precedence, once an established usage, is not now considered binding in decisions of this kind.

In searching the literature for some statement that may be construed as a decision by the first reviser, one is led to that of Hemming, 1935 (Gen. Hol. Butt. I, pp. 73-74), who says "The name *Junonia* Hb., though nomenclatorially valid, is not required, as *lavinia* Cram. is congeneric with *octavia* Cram., the type of *Precis* Hb., which has page priority."

The reference to page priority by Hemming does not, in my opinion, invalidate his action in uniting *Precis* and *Junonia*. It is my belief that the entire assemblage of species now placed under the two genera *Precis* and *Junonia* should be placed under *Precis* Huebner 1819, with *Junonia* Huebner 1819 as a junior synonym.

In America north of Mexico, there are four rather different looking insects representing the genus *Precis* (*Junonia* auct.) The taxonomic treatment of these has not been a matter of general agreement. One species is widely distributed over temperate and tropical North America. The others are largely confined to the southern tier of states, and south into Mexico and South America. Some of these entities are sympatric in certain places, though not necessarily inhabiting identical habitats. Klots (1951, p. 109) notes that in Florida two "so-called subspecies" occur in the same area. While such a situation cannot be stated categorically to be impossible, it does alter the usual concept of subspecies as races that replace one another geographically.

At least six names have been used at one time or another for our nearctic members of *Precis*. These are *coenia* Huebner 1822, *lavinia* Cramer 1775, *evarete* Cramer 1780, *zonalis* Felder & Felder 1867, *genoveva* Stoll 1782 and *nigrosuffusa* Barnes &

McDunnough 1916. In some instances, decisions as to which names are valid for our insects are at least partially subjective. In the case of the older names, where only figures and brief citations exist, the possibility of error is great. Moreover, members of the genus *Precis* are notable for individual variation. The opinions of the present author are given below, but are subject to change in the event of further information.

Precis coenia Huebner, (TL Cuba), the only species of wide distribution in America north of Mexico, is usually distinctive in appearance. The forewing subapical band is white or nearly so, prominent both above and below, and tends to surround the forewing eye spot. The upper (costal) eye spot of the hind wing is at least as large, and nearly always larger than, the forewing eye spot, and is oval in shape. The spines at the tip (cucullus, cuiller) of the valve (harpe) of the male are complex and numerous (Fig. 1-a), and strikingly similar to the same structures in the old world *Precis orithya* Linnaeus. At one time (Garth & Tilden, 1963, p. 33) I believed that the name *evarete* Cramer should be used for what is usually called *coenia* Huebner, and that it should be considered a subspecies of *Precis orithya* Linnaeus. I have had occasion to change both of these ideas, and now consider *coenia* a separate species.

The life history of *coenia* is well known. I have reared it from *Plantago, Mimulus* and *Antirrhinum.* Other food plants of record are *Gerardia, Linaria, Ludvigia, Sedum,* and *Phyla* (= *Lippia*). I am now convinced that some if not all of the references to *Phyla* as a food plant of *coenia* apply to the following species, *Precis evarete* Cramer, which at times has been considered synonymous with *coenia,* or united with it as a subspecies.

Along the southern border of the United States, an insect occurs in which the subapical band of the forewing is buffy, tan or orange. The costal eye spot of the hind wing is smaller than the forewing eye spot, and is round. The forewing apex is a bit more rounded than the forewing of *coenia.* This difference is noted in the figures in Ehrlich and Ehrlich, 1961, but is somewhat over emphasized. This insect has most often been treated as *lavinia* Cramer 1775, a name which, as a junior homonym of *Papilio lavinia* Fabricius 1775, is not available for use in the genus *Precis.* The oldest name that, on subjective taxonomic grounds, may be applied to this insect appears to be *evarete* Cramer 1780.

Cramer's figures of *Papilio lavinia* show a green gloss on the upper side, especially on the hind wings. Specimens with this appearance seem common south of the Meixcan border. The specimens I have seen from the United States do not show green coloration to this degree. The figures of *Papilio evarete* Cramer show a lighter forewing subapical band than is usual in material from the United States. The teeth of the valve tip are shown in Fig. 1-b. This figure is from a specimen taken in Oaxaca, Mexico, but specimens from Texas are nearly identical. Note the reduction of teeth on the projecting process, and the bifurcate condition of the tip of this process.

Precis zonalis F. & F., as represented by specimens from Florida, appears to be conspecific with *evarete,* both on phenetic and genitalic characters. However, some Florida examples lack the bifurcation of the process at the tip of the valve. (Fig. 1-d). *Precis zonalis* F. & F. is currently considered a subspecies of *Precis evarete* Cramer. This usage seems to be justified. It is possible that the specimens of *evarete* from Texas also belong to the subspecies *zonalis,* as some workers have stated.

The food plant of *Precis evarete* is probably Phyla (= *Lippia*).

In 1916 Barnes & McDunnough described *nigrosuffusa* as a subspecies of *Junonia coenia* Huebner, type locality Palmerlee, Arizona. Palmerlee is an old station in the Huachuca Mts., Cochise County. Since that time, it has been found that *nigrosuffusa* occurs in many places in southern Arizona, and extends east to the coastal plain and Offshore Islands of Texas.

Precis nigrosuffusa does not replace *Precis coenia* geographically. Both occur sympatrically over much of the range of *nigrosuffusa.* The two do not seem to mingle in nature, and each has rather different behavior. One food plant is known for *nigrosuffusa,* and I know of no record of this plant being fed upon by *coenia.* Their populations do not seem to peak at the same time. One may take fresh *coenia* and worn *nigrosuffusa* on the same day, and vice versa. There are also minor genitalic differences. It would appear that *nigrosuffusa* is in fact a distinct species.

In both Arizona and Texas, males of *nigrosuffusa* tend to be solitary and very conspicuous. They often perch on open places such as dirt roads or openings in the vegetation. If disturbed they fly away, often high in the air, but eventually return to

near the original site. In spite of the conspicuous behavior, *nigrosuffusa* seems to exist at much lower populational levels than *coenia* in the same places. After hours of observation, I have never seen either species show any interest in the other.

In addition to the very dark coloration, the costal eye spot of the hind wing of *nigrosuffusa* is small and round, and the forewing cell below is usually solid orange-brown. In *coenia* this cell shows the usual orange cell bars separated by ground color. The valve tip of a male *nigrosuffusa* is shown in Fig. 1-c. Note the short pointed process and the reduced number of teeth.

Precis nigrosuffusa has been reared by Roy O. Kendall of San Antonio, and by Everard Kinch of Fort Worth, Texas. The food plant is *Stemodia tomentosa* (Mill.) Greenm. & Thomps. To my knowledge, *nigrosuffusa* has not been reared in Arizona. However, *Stemodia durantifolia* (L.) Schwartz. is known to occur there and should be examined as a possible food plant.

On the basis of these several apparently consistent differences, I feel that *Precis nigrosuffusa* (B. & McD.) should be raised to specific rank. Certain other workers with whom I have discussed this matter are in agreement, but the responsibility for this action is mine.

The name *genoveva* Stoll 1782 has been used at times for one or another of our nearctic populations of *Precis*. Most of the specimens that I have examined under this name are *nigrosuffusa* from Texas. However, specimens of *Precis evarete* Cramer (*lavinia* Cramer auct.) have also been determined as *genoveva*. Ehrlich & Ehrlich (1961) use *lavinia* Cramer for what is here considered to be *coenia* Huebner, and use *genoveva* Stoll for what is here treated as *evarete* Cramer (= *lavinia* auct.). Dos Passos (1864) places *genoveva* as a junior synonym of *evarete* Cramer, a disposition of the name which seems to me to be correct.

In the course of this study the following species of *Precis* were examined:

Precis orithya (L.)
Precis atlites (Joh.)
Precis hierta (Fabr.)
Precis coenia (Hbn.)
Precis evarete (Cramer)
Precis nigrosuffusa (B. & McD.)

Key to the nearctic species of Precis:

1. Costal eye spot of hind wing as large and nearly always larger than, the forewing eye spot; widespread ..... *coenia*
   Costal eye spot of hind wing the same size or usually smaller than, the forewing eye spot; southern 2

2. Forewing subapical band orange-brown to yellowish; ground color not dark and suffused ..... *evarete*
   Ground color very dark and suffused; cell UNF usually nearly solid orange-brown ..... *nigrosuffusa*

The following changes in the dos Passos List are suggested: (forms and aberrations are not listed here)

Genus *Precis* Huebner "1818" (1819)

Type: *Papilio octavia* Cramer 1777

Synonym: *Junonia* Huebner "1818" (1819)

Type: *Papilio lavinia* Cramer 1775

531. *coenia* (Huebner) "1806" (1822)

531.1 *nigrosuffusa* (Barnes & McDunnough) 1916

532. *evarete* (Cramer) "1782" (1780)

a. *e. evarete* (Cramer) "1782" (1780)
lavinia (Cramer nec. Fabricius 1775) "1779" (1775)
genoveva (Stoll) 1782

b. *e. zonalis* (Felder & Felder) "1864-67" (1867)

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SUMMARY

The genus *Precis* Huebner 1819 and the genus *Junonia* are united, with *Precis* having precedence, as suggested by Hemming (1934). The status of the nearctic populations is discussed. *Nigrosuffusa* Barnes & McDunnough 1916, described as a subspecies of *coenia* Huebner 1822, is raised to specific status. A key to nearctic species is given and changes in the 1964 dos Passos Synonymic List of Nearctic Rhopalocera are proposed.

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